

WHAT IS CLAIMED IS:

1. A method of separating a composite member having a structure in which a first member having a separation layer inside is brought into tight contact with a second member,
5 wherein

said composite member has a projecting portion at which an outer peripheral edge of said first member projects outside that of said second member, and

- said method comprises the separation step of starting
10 separating said composite member from said projecting portion and then separating said composite member into two members at said separation layer.

2. The method according to claim 1, wherein a major surface of said first member has the same shape as that of
15 said second member, and said composite member has a structure in which the major surface of said first member is brought into tight contact with the major surface of said second member while shifting central positions from each other.

- 20 3. The method according to claim 1, wherein a major surface of said second member is smaller than that of said first member, and said composite member has a structure in which the major surface of said first member is brought into tight contact with the major surface of said second member.

- 25 4. The method according to claim 1, wherein the separation step comprises:

the pre-separation step of processing said projecting portion to form a separation start portion; and

the main separation step of starting separating said composite member from said separation start portion and
5 then breaking substantially only said separation layer to separate said composite member into two members at said separation layer.

5. A method of bringing a first member having a separation layer inside into tight contact with a second
10 member to manufacture a composite member having a projecting portion at which an outer peripheral edge of said first member projects outside that of said second member.

6. A method of transferring a transfer layer on a surface of a first member to a second member, comprising:

15 the preparation step of bringing a first member having a separation layer inside and said transfer layer on said separation layer into tight contact with a second member to prepare a composite member in which an outer peripheral edge of said first member projects outside that
20 of said second member; and

the separation step for starting separating said composite member from said projecting portion and separating said composite member into two members at said separation layer, thereby transferring said transfer layer
25 of said first member to said second member.

7. A separating method of separating into two substrates

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a bonded substrate stack having a structure formed by bringing a transfer layer of a first substrate having a separation layer inside and said transfer layer on said separation layer into tight contact with a second substrate,

5 wherein

said bonded substrate stack has a projecting portion at which an outer peripheral edge of said first substrate projects outside that of said second substrate, and

10 said separation method comprises the separation step of starting separating said bonded substrate stack from said projecting portion and then separating said bonded substrate stack into two substrates at said separation layer.

15 8. The method according to claim 7, wherein said first substrate has the same size as that of said second substrate, and said bonded substrate stack has a structure in which said first substrate and said second substrate are brought into tight contact while shifting central positions from each other.

20 9. The method according to claim 7, wherein said bonded substrate stack has a structure in which said first substrate is brought into tight contact with said second substrate smaller than said first substrate.

25 10. The method according to claim 7, wherein said second substrate has one of an orientation flat and a notch, and said bonded substrate stack has, as said projecting portion,

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a portion where said first substrate is exposed in the presence of the orientation flat or notch of said second substrate.

11. The method according to claim 7, wherein each of said
5 first substrate and said second substrate has one of an orientation flat and a notch, and said bonded substrate stack is formed by bringing said first substrate and said second substrate into tight contact with each other without matching the orientation flat or notch of said first
10 substrate with the orientation flat or notch of said second substrate, and has, as said projecting portion, a portion where said first substrate is exposed in the presence of the orientation flat or notch of said second substrate.

12. A method of bonding a transfer layer of a first
15 substrate having a separation layer inside and said transfer layer on said separation layer to a second substrate to manufacture a bonded substrate stack having a projecting portion at which an outer peripheral edge of said first substrate projects outside that of said second
20 substrate.

13. A transfer method of transferring a transfer layer on a surface of a first substrate to a second substrate, comprising:

the preparation step of bonding said transfer layer
25 of said first substrate having a separation layer inside and said transfer layer on said separation layer to said

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second substrate to prepare a bonded substrate stack having a projecting portion at which an outer peripheral edge of said first substrate projects outside that of said second substrate; and

5 the separation step of starting separating said bonded substrate stack from said projecting portion and then separating said bonded substrate stack at said separation layer, thereby transferring said transfer layer of said first substrate to said second substrate.

10 14. The method according to claim 13, wherein the preparation step comprises bringing said first substrate and said second substrate, which have the same size, into tight contact with each other while shifting central positions to prepare said bonded substrate stack.

15 15. The method according to claim 13, wherein the preparation step comprises bringing said first substrate into tight contact with said second substrate smaller than said first substrate to prepare said bonded substrate stack.

20 16. The method according to claim 13, wherein the preparation step comprises bringing said first substrate into tight contact with said second substrate having one of an orientation flat and a notch to prepare said bonded substrate stack having, as said projecting portion, a
25 portion where said first substrate is exposed in the presence of the orientation flat or notch of said second

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substrate.

17. The method according to claim 13, wherein the preparation step comprises preparing said first substrate and said second substrate each having one of an orientation flat and a notch, and bringing said first substrate and said second substrate into tight contact with each other without matching the orientation flat or notch of said first substrate with the orientation flat or notch of said second substrate to prepare said bonded substrate stack.

10 18. The method according to claim 13, wherein the separation step comprises:

the pre-separation step of processing said projecting portion to form a separation start portion; and starting separating said bonded substrate stack from said separation start portion and then breaking substantially only said separation layer to separate said bonded substrate stack into two substrates at said separation layer.

15 19. The method according to claim 18, wherein the pre-separation step comprises ejecting a fluid to said projecting portion to form said separation start portion by the fluid.

20 20. The method according to claim 18, wherein the pre-separation step comprises inserting a wedge-shaped member into a gap between said first substrate and said second substrate at said projecting portion to form said

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separation start portion.

21. The method according to claim 18, wherein the pre-separation step comprises supplying a vibration energy to said projecting portion to form said separation start portion.

22. The method according to claim 18, wherein the pre-separation step comprises dipping said projecting portion in a liquid and supplying a vibration energy to said projecting portion through the liquid to form said separation start portion.

23. The method according to claim 22, wherein water is used as the liquid.

24. The method according to claim 22, wherein an etchant is used as the liquid.

25. The method according to claim 18, wherein the pre-separation step comprises etching said transfer layer and said separation layer at said projecting portion to form said separation start portion.

26. The method according to claim 13, wherein the separation step comprises ejecting a fluid to said projecting portion to form said separation start portion on said bonded substrate stack and continuing separating said bonded substrate stack while changing a position where the fluid is injected.

27. The method according to claim 13, wherein the separation step comprises inserting a wedge-shaped member

into a gap between said first substrate and said second substrate at said projecting portion to separate said bonded substrate stack.

28. The method according to claim 18, wherein said separation start portion is a portion where said separation layer at said portion has the most fragile structure.

29. The method according to claim 18, wherein said separation start portion is a portion where said transfer layer at said portion is removed, and said separation layer under said transfer layer is exposed.

30. The method according to claim 18, wherein said separation start portion is a portion where said separation layer at said portion is exposed, and an outer peripheral edge of said separation layer is located inside said bonded substrate stack.

31. The method according to claim 13, wherein said separation layer is a porous layer.

32. The method according to claim 13, wherein said first substrate is a substrate formed by anodizing a substrate to form a porous layer as the separation layer and forming said transfer layer on said separation layer.

33. The method according to claim 13, wherein said first substrate has, as said separation layer, a porous layer formed by ion implantation.

34. The method according to claim 13, wherein said transfer layer includes a single-crystal Si layer.

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35. The method according to claim 13, wherein said transfer layer sequentially has a single-crystal Si layer and an insulating layer as said transfer layer.

36. A method of manufacturing an SOI substrate,
5 comprising:

the preparation step of bringing a surface of a first substrate having a porous layer inside and a transfer layer including a single-crystal Si layer on said porous layer into tight contact with a second substrate to prepare a
10 bonded substrate stack having a projecting portion at which an outer peripheral edge of said first substrate projects outside that of said second substrate;

the separation step for starting separating said bonded substrate stack from said projecting portion and
15 separating said bonded substrate stack at said porous layer, thereby transferring said transfer layer of said first substrate to said second substrate; and

the removal step of removing said porous layer remaining on a surface of said second substrate after
20 separation.

37. The method according to claim 36, wherein said first substrate has, as said transfer layer, not only said single-crystal Si layer but also an insulating layer on said single-crystal Si layer.

25 38. The method according to claim 36, wherein said second substrate has an insulating layer on a surface.

39. The method according to claim 36, wherein the preparation step comprises bringing said first substrate and said second substrate, which have the same size, into tight contact with each other while shifting central
5 positions to prepare said bonded substrate stack.

40. The method according to claim 36, wherein the preparation step comprises bringing said first substrate into tight contact with said second substrate smaller than said first substrate to prepare said bonded substrate
10 stack.

41. The method according to claim 40, wherein the preparation step comprises bringing said first substrate into tight contact with said second substrate while making the central positions match with each other.

42. The method according to claim 36, wherein the preparation step comprises bringing said first substrate into tight contact with said second substrate having one of an orientation flat and a notch to prepare said bonded
15 substrate stack having, as said projecting portion, a portion where said first substrate is exposed in the presence of the orientation flat or notch of said second substrate.

43. The method according to claim 36, wherein the preparation step comprises preparing said first substrate
20 and said second substrate each having one of an orientation flat and a notch, and bringing said first

substrate and said second substrate into tight contact with each other without matching the orientation flat or notch of said first substrate with the orientation flat or notch of said second substrate to prepare said bonded substrate stack.

44. The method according to claim 36, wherein the separation step comprises:

the pre-separation step of processing said projecting portion to form a separation start portion; and
starting separating said bonded substrate stack from said separation start portion and then breaking substantially only said porous layer to separate said bonded substrate stack into two substrates at said porous layer.

45. The method according to claim 44, wherein the pre-separation step comprises ejecting a fluid to said projecting portion to form said separation start portion by the fluid.

46. The method according to claim 44, wherein the pre-separation step comprises inserting a wedge-shaped member into a gap between said first substrate and said second substrate at said projecting portion to form said separation start portion.

47. The method according to claim 44, wherein the pre-separation step comprises supplying a vibration energy to said projecting portion to form said separation start

portion.

48. The method according to claim 44, wherein the pre-separation step comprises dipping said projecting portion in a liquid and supplying a vibration energy to said projecting portion through the liquid to form said separation start portion.

49. The method according to claim 48, wherein water is used as the liquid.

50. The method according to claim 48, wherein an etchant is used as the liquid.

51. The method according to claim 44, wherein the pre-separation step comprises etching said transfer layer and said porous layer at said projecting portion to form said separation start portion.

52. The method according to claim 36, wherein the separation step comprises ejecting a fluid to said projecting portion to form said separation start portion on said bonded substrate stack and continuing separating said bonded substrate stack while changing a position where the fluid is injected.

53. The method according to claim 36, wherein the separation step comprises inserting a wedge-shaped member into a gap between said first substrate and said second substrate at said projecting portion to separate said bonded substrate stack.

54. The method according to claim 36, wherein said

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separation start portion is a portion where said porous layer at said portion has the most fragile structure.

55. The method according to claim 36, wherein said separation start portion is a portion where said transfer layer at said portion is removed, and said porous layer under said transfer layer is exposed.

56. The method according to claim 36, wherein said separation start portion is a portion where said porous layer at said portion is exposed, and an outer peripheral edge of said porous layer is located inside said bonded substrate stack.

57. A composite member having a structure in which a first member having a separation layer inside is brought into tight contact with a second member, comprising:
15 a projecting portion at which an outer peripheral edge of said first member projects outside that of said second member.

58. A bonded substrate stack having a structure in which a first substrate having a separation layer inside and a transfer layer on said separation layer is brought into tight contact with a second substrate, comprising:

a projecting portion at which an outer peripheral edge of said first substrate projects outside that of said second substrate.

59. A bonded substrate stack formed by bonding a surface of a first substrate having a porous layer inside and a

transfer layer including a single-crystal Si layer on said porous layer to a second substrate, comprising:

a projecting portion at which an outer peripheral edge of said first substrate projects outside that of said
5 second substrate.

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